

## CLAIMS

1. A system for producing permanent ink-jet images, comprising:

5 a) a media substrate coated with a porous media coating, said porous media coating comprising inorganic porous particulates, wherein at least a portion of the inorganic porous particulates have a first reactive group covalently attached thereto; and

b) an ink-jet ink including a dye, said dye comprising a second reactive group, wherein the first reactive group and the second reactive group are  
10 configured to react with one another upon contact to form a covalent bond.

2. A system as in claim 1, wherein the inorganic porous particulates comprise a member selected from the group consisting of silica particulates, alumina particulates, titania particulates, zirconia particulates, organo-metallic  
15 particulates, and combinations thereof.

3. A system as in claim 1, wherein one of the first and second reactive groups is an amine, and the other of the first and second reactive groups is selected from the group consisting of an aldehyde, an epoxy, an alkyl methylol, a  
20 capped aldehyde, a diketone, an acetylacetoxy, and a hindered isocyanate.

4. A system as in claim 1, wherein one of the first and second reactive groups is an aldehyde, and the other of the first and second reactive groups is selected from the group consisting of a thiol and an amide.  
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5. A system as in claim 1, wherein one of the first and second reactive groups is a hydroxyl, and the other of the first and second reactive groups is selected from the group consisting of a carboxyl, an activated methoxy, and hindered isocyanate.  
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6. A system as in claim 1, wherein one of the first and second reactive groups is an amide, and the other of the first and second reactive groups is selected from the group consisting of an alkyl methylol, an activated methoxy, and a hindered isocyanate.

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7. A system as in claim 1, wherein one of the first and second reactive groups is an acetyl, and the other of the first and second reactive groups is a dihydrazide.

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8. A system as in claim 1, wherein the first reactive group is attached to the inorganic porous particulate through a silane spacer group.

9. A method of producing permanent ink-jet images, comprising:

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a) covalently bonding a first reactive group to an inorganic porous particulate;

b) coating the inorganic porous particulate onto a media substrate to form a coated media substrate; and

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c) ink-jetting a dye-containing ink-jet ink composition onto the coated media substrate, said dye including a second reactive group, wherein the first reactive group and the second reactive group interact upon contact to form a covalent bond.

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10. A method as in claim 9, wherein the inorganic porous particulates comprise a member selected from the group consisting of silica particulates, alumina particulates, titania particulates, zirconia particulates, organo-metallic particulates, and combinations thereof.

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11. A method as in claim 9, wherein one of the first and second reactive groups is an amine, and the other of the first and second reactive groups is selected from the group consisting of an aldehyde, an epoxy, an alkyl methylol, a

capped aldehyde, a diketone, an acetylacetoxy, and a hindered isocyanate.

12. A method as in claim 9, wherein one of the first and second reactive groups is an aldehyde, and the other of the first and second reactive groups is  
5 selected from the group consisting of a thiol and an amide.

13. A method as in claim 9, wherein one of the first and second reactive groups is a hydroxyl, and the other of the first and second reactive groups is selected from the group consisting of a carboxyl, an activated methoxy, and  
10 hindered isocyanate.

14. A method as in claim 9, wherein one of the first and second reactive groups is an amide, and the other of the first and second reactive groups is selected from the group consisting of an alkyl methylol, an activated methoxy, and a hindered isocyanate.  
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15. A method as in claim 9, wherein one of the first and second reactive groups is an acetyl, and the other of the first and second reactive groups is a dihydrazide.  
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16. A method as in claim 9, wherein the first reactive group is attached to the inorganic porous particulate through a silane spacer group.

17. A printed image on a media substrate, comprising:  
25 a) a media substrate coated with a porous coating, said porous coating comprising inorganic porous particulates, wherein at least a portion of the inorganic porous particulates have a first reactive group covalently attached thereto; and  
b) an ink-jet ink including a dye printed on the porous coating, said dye  
30 comprising a second reactive group, wherein the first reactive group and the

second reactive group are covalently bonded to one another.

18. A printed image on a media substrate as in claim 17, wherein the inorganic porous particulates comprise a member selected from the group consisting of silica particulates, alumina particulates, titania particulates, zirconia  
5 particulates, organo-metallic particulates, and combinations thereof.

19. A printed image on a media substrate as in claim 17, wherein one of the first and second reactive groups is an amine, and the other of the first and  
10 second reactive groups is selected from the group consisting of an aldehyde, an epoxy, an alkyl methylol, a capped aldehyde, a diketone, an acetylacetoxy, and a hindered isocyanate.

20. A printed image on a media substrate as in claim 17, wherein one of  
15 the first and second reactive groups is an aldehyde, and the other of the first and second reactive groups is selected from the group consisting of a thiol and an amide.

21. A printed image on a media substrate as in claim 17, wherein one of  
20 the first and second reactive groups is a hydroxyl, and the other of the first and second reactive groups is selected from the group consisting of a carboxyl, an activated methoxy, and hindered isocyanate.

22. A printed image on a media substrate as in claim 17, wherein one of  
25 the first and second reactive groups is an amide, and the other of the first and second reactive groups is selected from the group consisting of an alkyl methylol, an activated methoxy, and a hindered isocyanate.

23. A printed image on a media substrate as in claim 17, wherein one of  
30 the first and second reactive groups is an acetyl, and the other of the first and

second reactive groups is a dihydrazide.

24. A printed image on a media substrate as in claim 17, wherein the first  
reactive group is attached to the inorganic porous particulate through a silane  
5 spacer group.

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